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RECORD OF TELEPHONE CONVERSATION

PROJECT: Solar Evaporation Ponds, OU4 IM/IRA

PHONE CALL TO:	Mark Austin, EG&G Doug Few, EG&G Andy Ledford, EG&G Kathy London, EG&G Brook Wilson, EG&G Rich Ninesteel, HNUS	**DATE:** September 29, 1994
PHONE CALL FROM:	Harry Heidkamp Phil Nixon Ron Schmiermund	**DOC #:** SP307:093094:02

COPIES:

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SUBJECT: OU4 Waste Testing for Modelling Effort

Andy Ledford started by reviewing the strategy as it was known up to this point. Parsons Engineering Science's (Parsons's) concern is that the VLEACH model capabilities will be exceeded when the soil/waste mixtures are being modelled and therefore the confidence of the results will be low with respect to protectiveness of human health and the environment. Some public reviewers may likely question why we would continue to use VLEACH. VS2DT requires many chemical and physical input variables. Soils and liners are available so someone can do the tests on them.

Ron Schmiermund discussed the conceptual strategy flowchart that was faxed to Andy Ledford and Rich Ninesteel which depicts all things that must happen in order to achieve the desired results. The most important physical variable is the soil and soil/waste moisture retention curves. Other common physical variables are materials porosities, hydraulic conductivities, and bulk densities. The only important chemical variable is the K_d or some other factor that

represents the partitioning of specific contaminants between the solid and liquid phases. All of the variables should be measured at the final constructed conditions. The K_ds are thought to be the most important factors, however it is possible that the hydraulic characteristics may be determined through testing to be the most influential factors.

Rich Ninesteel stated that the schedule for this work will be rapid and that the new model needs to be initially executed with conservative data assumptions to determine an initial acceptable leachate quality. HNUS does not yet have soil or waste samples in-house. Because of this and the necessary time to perform the tests, it may be as long as three months before test results are obtained. Rich suggested that a sensitivity analysis be done using conservative data to screen the variables.

Ron Schmiermund stated that the only information that may currently be available is for the native OU4 soils. Parsons has considered the potential to derive the required data from the native soils, but does not think it would be appropriate to attempt this for soil/waste mixtures with significant waste ratios. The flowchart addresses logistical problems and how test materials can be procured and tested.

Kathy London asked what data could be used now to run the new model. Ron Schmiermund replied that model development starts at the bootstrapping step in the flow chart. *In situ* OU4 soil physical parameters and K_ds from the literature could form the basis for extrapolation, but the resultant credibility of model results is unknown. The model would require updating with the laboratory results. At that point we would have everything except the soil/waste mixture data. A specification envelope would be defined and a matrix of variables would be given to the laboratory. The credibility of the initial envelope is unknown.

Rich Ninesteel emphasized that with the schedule constraints, the laboratory will need something upfront to get started. We should agree on some set of initial variable values to perform a sensitivity analysis. Kathy London suggested setting this up contractually and for HNUS to include a treatability study in their proposal due to EG&G.

Brook Wilson asked what was the status of materials samples availability. Ron Schmiermund replied that there probably is enough drummed soil and liner materials on-site, but pondcrete is still a problem. Kathy London asked what tests will be specified. Ron replied that the tests are specified and that the larger problems will be how to get sample materials to the laboratory and then to determine what mixtures will be proposed. Kathy stated that the acceptance criteria will be used. Brook suggested focusing on the proctor and moisture/density relationships, and then expanding from there. Rich Ninesteel generally agreed and said that if the proctors were acceptable, then continue with the additional tests.

Phil Nixon stated that a list of tests were recently submitted to Andy Ledford. Rich Ninesteel stated that the laboratory will reduce the list of initial conservative recipes and predicted that the process will confirm conservative data values. Andy Ledford agreed and added that the process will be iterative. Rich stated that the laboratory will need to know if the recipe meets the physical **and** chemical parameters. Andy asked if there was now enough soil information and if HNUS needed to help in determining initial conservative values. Ron Schmiermund said that HNUS input would be beneficial. Phil asked if the soil/sludge mixture proportions had been determined. Rich said that the treatability study has yet to determine this. Phil stated that

Parsons can develop the soil/liner mixture and soil data, but that HNUS will need to provide the soil/pondcrete and soil/sludge mixtures data. Ron asked if HNUS had any insight on the liner material. Rich stated that infiltration rates and K_ds were most influential at Fernald. He will need to discuss the moisture retention curve issue with his modelling people. Ron stated that the use of surrogate rain, as defined in "Standard Methods", 18th Ed., under "Water, Reconstituted, Precipitation", is preferred. Brook Wilson asked if transport mechanisms were important since the soils are clay-like. Ron said that the model avoids these complexities since it employs an empirical method of analysis, but that we need to see how the constituents leach from the materials. Andy stated that we are assuming that leaching occurs under saturated conditions. Ron stated that bulk properties and K_ds will be determined in a mixed reactor by performing about four tests for each waste mixture. Phil Nixon stated that the contaminants of concern were still plutonium, americium, uranium, and cadmium. Ron reiterated that we need K_ds that are specific to RFETS soils.

Phil Nixon asked Rich Ninesteel what HNUS needs from Parsons. Rich stated that they need to see how much time is available for testing and that they now only have draft statements of work. Rich Ninesteel said that they have chemical and radiochemical laboratories that have been audited by EG&G. They have ordered a ball mill and a National Bureau of Standards rotary extractor. They are capable of doing any analysis needed for this work. Rich requested that detection limits be considered since tests run to equilibrium would take weeks to complete. Ron stated that test mixtures can be made up that will provide analyte concentrations that are ten times the contract detection limits (that were provided by EG&G). This could be calculated from the best guess K_ds and determining how much water can be used to make the mixture. It will be useful to know what HNUS's practical detection limits are and how much time would be available to allow the mixtures to equilibrate. Phil Nixon said that target limits for remediation are available and can help determine required detection limits. Andy Ledford asked how nitrate could be included in the test plan. Ron replied that it would not be difficult to include this. Phil added that no other constituents need to be addressed since there are no chemical specific ARARs.

Andy Ledford asked if we can now postulate when an endpoint will be reached. Phil Nixon said it would take two weeks to perform the bootstrap step. HNUS will need to provide their first professional opinion of the parameters and Parsons will need to provide their professional opinion of the K_ds. Rich Ninesteel said that soils data is in the works since they also need it. HNUS needs for analysis the quantities of soils (about 2,500 pounds) and sludge requested in their recent technical proposal and new pondcrete material since their old pondcrete material is less than 10 mesh in size. Tom Beckman should be the person to address the schedule for obtaining test materials. Andy suggested that we shoot for early February as the first cut target. Rich said HNUS needs to discuss this in-house.

Harry Heidkamp asked if pallets and plastic wrappers were to be included with the sludge mixture. Rich Ninesteel said that these materials are to be included with the pondcrete formulation. Ron Schmiermund asked if there was any anticipated problem with humic acids generated from the decomposition of the wood pallets. Rich said that soils already have some humic acid content and that the pallets (which will be treated) were expected to increase the soils humic acid content only by 0.1 to 0.5 points. The pallets will be size-reduced to whatever requirement given to HNUS. It is anticipated that the outer plastic wrapper will take 10 minutes to remove from the pondcrete package. The inner plastic wrapper around the waste form itself

is expected to take much more effort and may be impossible to remove entirely from the solidified pondcrete. Rich suggested talking with Leon Collins or Tom Beckman concerning the strategy to include pallets and plastic wrappers in the waste mixture.

ACTION ITEMS

1. Parsons to submit to EG&G a list of modelling variables and a sample handling protocol.

2. Parsons to submit to EG&G a list of COC target limits of remediation.

3. HNUS to submit by next Friday a letter to Tom Beckman, EG&G stating their best estimates of bulk densities. porosities, hydraulic conductivities, K_ds, and moisture retention curves for soil/sludge waste and soil/pondcrete waste mixtures at 90 percent Proctor.

4. Parsons to submit in two weeks to EG&G the results of the bootstrap run of the model using Parsons's and HNUS's developed data.

5. EG&G to provide to HNUS a copy of Parsons's transmittal to EG&G containing chemical data requirements.